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(19)

(54) BACK COATED FLOOR COVERING

(71) We, IMPERIAL CHEMICAL INDUSTRIES LIMITED, Imperial Chemical House, Millbank, London SW1P 3JF a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates to floor coverings.

Solid and fabric floor coverings, particularly tiles, bonded directly to a heavy backing, are well known. The backing usually comprises filled or highly filled poly(vinyl chloride), plasticised poly(vinyl chloride), natural and/or synthetic latex or thermoplastic polymers, such as polyethylene and polypropylene, and other polymers such as bitumen. The fillers may be for example chalk, kaolin, silica, barium sulphate and other inorganic materials. The usual filler/polymer ratio is 1:1 to 3:1 by weight.

In known processes for making felt floor covering the back of the covering is coated in order to anchor the loops or fibres into a base web. Also the fibres have to be anchored in order to improve the stripping strength and abrasion resistance of the flooring under traffic conditions. This coating may be a polyurethane, and further, the polyurethane may be foamed. To such a foam layer it is further known to apply a backing, such as jute or foam rubber. However such backings are not suitable when the product is used in the form of tiles. We have now found that certain backing materials give especially good results when applied to fabric floor coverings having a polyurethane backing.

According to the present invention we provide a process for making a floor covering which comprises the steps of coating a tufted or felt floor covering material with a mixture of polyurethane forming chemicals, allowing said chemicals to react to produce a flexible polyurethane layer and applying thereon a layer of filled thermoplastic material.

In this process, the floor covering moves over a table with its unbacked back-side uppermost. The polyurethane forming chemicals are then spread, preferably sprayed from, for example at least one spray head, which can traverse over the width of the back of the floor covering. Spraying may be assisted by means of an air-jet. Spraying is also preferably effected in overlapping levels or layers in a zig-zag fashion. The weight of polyurethane applied is preferably in the range 10 to 400 g/m² and accordingly is lower than that required in the hitherto conventional methods hereinbefore described. The polyurethane is preferably foamed in order to reduce cost of raw materials.

The characteristics of the liquid mixture of polyurethane forming chemicals can be selected to maximise adhesion of the fibres to the backing web whilst minimising strike-through because the chemicals react quickly and almost spontaneously to produce polyurethane. The liquid mixture of the polyurethane forming ingredients which is used in the formation of the coating may be a mixture containing ingredients such as have already been described in the prior art relating to the manufacture of flexible polyurethanes.

The principal ingredients of such mixtures are an organic polyisocyanate, a polyether or polyester polyol having a hydroxyl number of from 30 to 100 preferably 30 to 70, and, if to be foamed, water as blowing agent. Additionally the reaction mixture usually contains one or more catalysts and surface active agents and optionally other adjuvants such as fillers, flame-proofing agents and blowing agents such as trichlorofluoromethane. Suitable polyisocyanates include tolylene diisocyanate and diphenylmethane diisocyanate either of which may be in substantially pure or crude form and mixtures of such isocyanates. Suitable polyols include polyether diols and triols derived from propylene oxide or propylene and ethylene oxides. Catalysts which may be used include organic tin compounds and

tertiary amines. The speed of reaction and the absence of heat in the formation of the polyurethane coating enables coating of the heavy duty layer to be carried out almost immediately, facilitating a continuous process.

Suitable thermoplastics for the heavy duty filled thermoplastic layer include those hereinbefore described, together with copolymers of ethylene with, for example, vinyl acetate. The thermoplastic layer is most readily applied as a melt followed by subsequent cooling, or it may be applied as a powder and subsequently fused to form the layer.

The invention is illustrated with reference to the following example.

A tufted carpet was fed with uncoated back-side uppermost into an apparatus comprising a table which was wider than the carpet by about 10 cm on each side. Above the table, a spray head was provided together with a slide rod and drive mechanism by means of which the spray-head could be made to traverse the table. Pipes to the spray-head supplied polyurethane foam forming chemicals which react almost spontaneously to form polyurethane. The carpet was coated with polyurethane at a weight of 150 gm^{-2}. After coating with polyurethane, the coated carpet was continuously fed into an oven in which atactic polypropylene containing 100 parts by weight of filler per hundred parts of polypropylene was spread and melted a weight of 3 kg m^{-2}. The carpet was then cooled using air jets and cut into tiles. The tiles could be repeatedly flexed and walked upon without break of adhesion between the carpet and the heavy-duty theremoplastic backing. The abrasion resistance of the pile was also improved because of the used polyurethane coating.

A similar but heavier coating was prepared using non-foamed polyurethane.

WHAT WE CLAIM IS:—

1. A process for making a floor covering which comprises the steps of coating a tufted or a felt floor covering material with a mixture of polyurethane forming chemicals, allowing said chemicals to react to produce a flexible polyurethane layer and applying thereon a layer of a filled thermoplastic material.

2. A process according to claim 1 in which the polyurethane layer has a density in the range 10 to 400 g/m^2.

3. A process according to claim 1 or claim 2 in which the polyurethane is foamed.

4. A process according to any one of claims 1 to 3 in which the layer of filled thermoplastic material is formed by applying the filled thermoplastic as a powder and subsequently fusing it to form the layer.

5. A process according to any one of claims 1 to 4 in which the thermoplastic is polypropylene.

6. A process according to claim 1 substantially as hereinbefore described and illustrated with reference to the Example.

7. A floor covering whenever produced by a process as claimed in any one of claims 1 to 6.

8. A floor covering according to claim 7 in the form of a tile.

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